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EXAMINER
CANNING, ANTHONY J

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 11/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/682,024	OHISHI ET AL.	
	Examiner	Art Unit	
	Anthony J. Canning	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 September 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement of Amendment

1. The amendment to the instant application was received and entered on 16 September 2005.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 3, 8-11, 13, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsutake et al. (U.S. 5,760,538) in view of Curtin et al. (U.S. 5,477,105).

4. Regarding claims 1, 15 and 16, Mitsutake et al. disclose a flat panel display device (column 1, lines 10-12) including: a rear substrate (see Fig. 2, item 15; column 6, line 60)

including an insulating substrate (see Fig. 2, item 11; column 6, line 60; column 7, lines 17-21, glass and silicon dioxide are both examples of insulators) and a plurality of cold cathode elements (see Fig. 2, item 12; column 7, lines 49-51) disposed on the insulating substrate capable of emitting electrons (column 1, lines 18-20); a display substrate (see Fig. 2, item 17; column 7, lines 28-29) including a light-transmissive substrate (see Fig. 2, item 17; column 7, lines 35-43) disposed to face the rear substrate (see Fig. 2, the positional relationship between items 15 and 17, they are parallel to one another) and phosphors disposed on the light-transmissive substrate (see Fig. 2, item 18; column 8, lines 5-10) capable of generating light when excited by electron beams from the plurality of cold cathode elements; a peripheral frame member interposed between the rear substrate and the display substrate (see Fig. 2, items 15, 16, and 17; column 7, lines 28-35) such that a space enclosed by the peripheral frame member, the rear substrate and the display substrate is vacuum tight (column 7, lines 28-30); and a metal back adapted to be supplied with an anode voltage for leading the electrons from the plurality of cold cathode elements toward the phosphor (see Fig. 25, item 19; column 29, lines 40-54); wherein each of the plurality of holes has a corresponding one of the phosphors disposed therewithin. Mitsutake et al. fail to specifically disclose a metal sheet provided on a surface of the light-transmissive substrate facing toward the rear substrate and perforated with a plurality of holes each corresponding to one of the plurality of cold cathode elements. Mitsutake et al. also fail to specifically disclose that the thickness of the metal sheet is greater than a thickness of the phosphors disposed within the plurality of holes.

Curtin et al. disclose a flat panel display device with a metal sheet provided on a surface of the light-transmissive substrate facing toward the rear substrate and perforated with a plurality

of holes each corresponding to one of the plurality of cold cathode elements (see Fig. 2, item 311; column 5, lines 20-26). Gate electrodes are commonly used to extract electrons from the emitter material. Curtin et al. further disclose that the thickness of the metal sheet is greater than that of the phosphor (see Fig. 2, items 313, 314 and 315; column 6, lines 28-39, lines 62-67; column 7, lines 1-2). Curtin et al. further disclose that it's advantageous to have the metal sheet thicker than the phosphor to improve the contrast of the light-emitting structure and the color purity (column 2, lines 21-25).

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the flat panel display device of Mitsutake et al. to include a metal sheet provided on a surface of the light-transmissive substrate facing toward the rear substrate and perforated with a plurality of holes each corresponding to one of the plurality of cold cathode elements, as taught by Curtin et al., to help extract electrons from the emissive layer, and to have a metal layer thicker than the phosphor, also taught by Curtin et al., to improve contrast and color purity.

5. Regarding claim 3, Mitsutake et al. disclose a flat panel display device according to claim 1. The further limitation that the metal sheet is perforated with the plurality of holes after the metal sheet is affixed to the light-transmissive substrate with an adherent layer is a product-by-process claim. In an ex parte case, product-by-process claims are not construed as being limited to the product formed by the specific process recited. *In re Hirao et al.*, 535 F2d 67, 190 U.S.P.Q. 15, see footnote 3 (CCPA 1976).

6. Regarding claim 7, Mitsutake et al. disclose a flat panel display device according to claim 1. Mitsutake et al. fail to disclose that the metal sheet has a uniform thickness in a range of from

20 μm to 250 μm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a metal sheet in the range of 20 to 250 μm in thickness, since it has been held that where the general conditions of a claim are discussed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the flat panel display device of Mitsutake et al. to incorporate the metal layer with a thickness of 20 to 250 μm as an optimum or workable range.

7. Regarding claim 8, Mitsutake et al. disclose a flat panel display device according to claim 1, wherein the metal sheet is made of an alloy made chiefly of Fe—Ni (column 8, lines 20-24). The examiner notes that Mitsutake et al. disclose that "*graphite is normally used for the black electroconductive members, other conductive material having low light tranmissivity and reflective may alternately be used.*" An iron-nickel alloy falls within this criteria.

8. Regarding claim 9, Mitsutake et al. disclose a flat panel display device according to claim 1, wherein a cross-sectional shape of the holes is rounded (see Fig. 4B, items 21a and 21b; the holes in the metal member (21b) are rounded).

8. Regarding claim 10, Mitsutake et al. disclose a flat panel display device according to claim 1, wherein a surface of the metal sheet facing toward the light-transmissive substrate is approximately black (see Fig. 4B, item 21b; column 8, lines 14-19).

9. Regarding claim 11, Mitsutake et al. disclose a flat panel display device according to claim 1, wherein inner walls of the plurality of holes are electrically conductive (column 8, line 14, "*Black **electroconductive** members*"; column 8, lines 34-38). Because the entire member is

referred to as electroconductive, the examiner interprets that the inner walls of the holes in the electroconductive member will also exhibit electroconductivity.

10. Regarding claims 13 and 17, Mitsutake et al. disclose a flat panel display device according to claims 1 and 16. Mitsutake et al. further disclose that wherein the metal sheet is provided on a side thereof facing toward the rear substrate with a metal back, and that the black sheet is electrically conductive (see Fig. 25, item 19; column 29, lines 40-54).

11. Regarding claim 18, Mitsutake et al. disclose a flat panel display device according to claim 16, wherein the black sheet is made of a metal (see Fig. 2, item 19; see Fig. 4B, item 21b; column 8, lines 20-24; column 8, lines 30-44).

12. Claims 14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsutake et al. (U.S. 5,760,538) in view of in view of Curtin et al. (U.S. 5,477,105) and in further view of Spindt (U.S. 5,990,614).

13. Regarding claim 14, Mitsutake et al. and Curtin et al. disclose a flat panel display device according to claim 1. Mitsutake et al. further disclose that the flat panel display device further includes spacers for maintaining a spacing between the rear substrate and the display substrate (see Fig. 2, item 20; column 8, lines 59-63). Mitsutake et al. fail to teach that the metal sheet is provided with recesses for holding the spacers.

Spindt discloses a flat panel display device, which provides the metal sheet with recesses capable of holding the spacers (see Fig. 3, items 16 and 74; column 10, lines 55-56; column 11, lines 26-31). It would be advantageous to provide recesses in the metal sheet to hold the spacers for added stability. The examiner interprets the grooves in the metal sheet (74) to be recesses,

such as the recesses in the focusing structure (58). Both recesses do house the end portions of the spacers and aid in stabilizing the spacers.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the flat panel display device of Mitsutake et al. to incorporate recesses in the metal sheet, as taught by Mitsutake et al., for the added benefit of added stability.

14. Regarding claim 19, Mitsutake et al. disclose a flat panel display device (column 1, lines 10-12) including: a rear substrate (see Fig. 2, item 15; column 6, line 60) provided with a plurality of cold cathode elements (see Fig. 2, item 12; column 7, lines 49-51) capable of emitting electrons (column 1, lines 18-20); a display substrate (see Fig. 2, item 17; column 7, lines 28-29) including a light-transmissive substrate (see Fig. 2, item 17; column 7, lines 35-43, glass and silicon dioxide are both examples of insulators) disposed to face the rear substrate (see Fig. 2, the positional relationship between items 15 and 17, they are parallel to one another); spacers interposed between the rear substrate and the display substrate for maintaining a spacing therebetween (see Fig. 2, item 20; column 8, lines 59-63); and a metal back adapted to be supplied with an anode voltage for leading the electrons from the plurality of cold cathode elements toward the phosphor (see Fig. 25, item 19; column 29, lines 40-54), wherein the electrically conductive sheet is perforated with a plurality of holes each corresponding to one of the plurality of cold cathode elements (see Fig. 2, item 19; see Fig. 4B, item 21b; column 8, lines 5-23; column 8, lines 30-44), each of the plurality of holes having a phosphor disposed therewithin for generating light when excited by the electrons emitted from the plurality of cold cathode elements (see Fig. 4b, item 21a; column 8, lines 10-14). Mitsutake et al. fail to teach and an electrically conductive sheet provided on a surface of the light-transmissive substrate

facing toward the rear substrate. Mitsutake et al. also fail to teach the conductive sheet is provided with recesses for holding the spacers, at positions of the electrically conductive sheet, which do not interfere with the plurality of holes.

Curtin et al. disclose a flat panel display device with a metal sheet provided on a surface of the light-transmissive substrate facing toward the rear substrate and perforated with a plurality of holes each corresponding to one of the plurality of cold cathode elements (see Fig. 2, item 311; column 5, lines 20-26). Gate electrodes are commonly used to extract electrons from the emitter material. Curtin et al. further disclose that the thickness of the metal sheet is greater than that of the phosphor (see Fig. 2, items 313, 314 and 315; column 6, lines 28-39, lines 62-67; column 7, lines 1-2). Curtin et al. further disclose that it's advantageous to have the metal sheet thicker than the phosphor to improve the contrast of the light-emitting structure and the color purity (column 2, lines 21-25).

Spindt discloses a flat panel display device, which provides the metal sheet with recesses capable of holding the spacers (see Fig. 3, items 16 and 74; column 10, lines 55-56; column 11, lines 26-31). It would be advantageous to provide recesses in the metal sheet to hold the spacers for added stability. The examiner interprets the grooves in the metal sheet (74) to be recesses, such as the recesses in the focusing structure (58). Both recesses do house the end portions of the spacers and aid in stabilizing the spacers. The spacers (16) are placed in positions that do not block the phosphor regions (70).

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the flat panel display device of Mitsutake et al. to incorporate recesses in the metal sheet, as taught by Spindt et al., for the added benefit of added stability, and

to include a metal sheet provided on a surface of the light-transmissive substrate facing toward the rear substrate and perforated with a plurality of holes each corresponding to one of the plurality of cold cathode elements, as taught by Curtin et al., to help extract electrons from the emissive layer, and to have a metal layer thicker than the phosphor, also taught by Curtin et al., to improve contrast and color purity.

15. Regarding claim 20, Mitsutake et al., Curtin et al. and Spindt disclose a plat panel display device according to claim 19. Curtin et al. further disclose that the electrically conductive sheet is provided on a side thereof facing toward the rear substrate with the metal back (see Fig. 1A, item 202 and 206; column 3, lines 51-66). Electrically conductive sheets are commonly used to enhance electron emission.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the flat panel display of Mitsutake et al. to include that the electrically conductive sheet is provided on a side thereof facing toward the rear substrate with the metal back, as taught by Curtin et al., to aid in electron extraction.

16. Claims 2 and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsutake et al. (U.S. 5,760,538) in view of Ando et al. (U.S. 2002/0079829 A1).

17. Regarding claim 2, Mitsutake et al. disclose a flat panel display device according to claim 1. Mitsutake et al. fail to disclose that the display substrate further includes an adherent layer for affixing the metal sheet to the light-transmissive substrate.

Ando et al. disclose a flat panel display device wherein an adherent layer (see Fig. 6, item 1041; paragraph 0098, line 9) for affixing a metal sheet (see Fig. 6, item 1019; paragraph 0098, line 6) to a spacer (see Fig. 6, item 1020; paragraph 0098, line 9). While the examiner notes that Ando et al. do not disclose an adherent layer specifically for bonding the metal layer to the light-transmissive substrate, Ando et al. do teach the use of a bonding layer for adhering the metal sheet to another component of the flat panel display device.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the flat panel display device of Mitsutake et al. to include an adherent layer for affixing the metal sheet to the light-transmissive substrate, as a method of bonding the metal sheet to the light-transmissive substrate, as taught by Ando et al.

18. Regarding claim 4, Mitsutake et al. and Ando et al. disclose a flat panel display device according to claim 2. Ando et al. further disclose that the adherent layer is made chiefly of one of glass, ceramics and alumina (see Fig. 6, item 1041; paragraph 0125). Ando et al. disclose that the adherent layer can be made of glass frit. Ando et al. further disclose that glass frit is a suitable material for the adhesive layer (paragraph 0125, lines 4-6).

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the flat panel display device of Mitsutake et al. to use glass, ceramics, or alumina as a bonding layer used to bond the metal layer to another component of the display device, as taught by Ando et al., as a suitable material for the adhesive layer.

19. Regarding claim 5, Mitsutake et al. and Ando et al. disclose a flat panel display device according to claim 4. Ando et al. disclose that the adherent layer is made chiefly of one of a glass, ceramics and alumina (paragraph 0125). By specifying a material for use as the adherent

layer, such as frit glass, the light-transmission of the layer is limited to a specified value. The applicant cites frit glass as an example of a material that can be used as the adherent layer on page 12 of the specification of the instant application. By choosing frit glass, of a specific light-transmission value the contrast ratio can of the display device can be improved.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the flat panel display device of Mitsutake et al. to include an adhesive layer of glass frit, which has a specific light-transmission, as taught by Ando et al., for adjoining the metal sheet to another component in the flat panel display device, which has been shown in the art of cathode ray tubes to improve contrast ratio.

20. Regarding claim 6, Mitsutake et al. and Ando et al. disclose a flat panel display device according to claim 2. Ando et al. further disclose that the substrate (see Fig. 8B, item 1101; paragraph 0140) can be made of alumina. The materials cited in paragraph 0140 by Ando et al. can be used for either substrate. Ando et al. also discloses that the bonding agent has electroconductive filler within (paragraph 0125). In paragraph 0124, Ando et al. disclose that aluminum can be used as a low resistance or electroconductive material. Aluminum can be used as the metal layer (paragraph 0094, lines 9-12). Alumina, glass frit, with the proper doping of aluminum, and aluminum all approximately have the same coefficient of thermal expansion. Having materials with similar thermal expansion coefficients will reduce damage caused the expansion of different components of the flat panel display at different rates.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the flat panel display device of Mitsutake et al. to include that the light-tranmissive layer, the metal layer, and the adhesive layer all have the same thermal

expansion coefficients to reduce the risk of damage caused by the expansion of those components at different rates.

21. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsutake et al. (U.S. 5,760,538) in view Mizobata (U.S. 6,333,600 B1).

22. Regarding claim 12, Mitsutake et al. disclose a flat panel display device according to claim 1. Mitsutake et al. fail to teach that a cross-sectional shape of the phosphors is generally U-shaped.

Mizobata discloses a flat panel display device wherein the cross-sectional shape of the phosphors is generally U-shaped (see Fig. 1, item 9; column 3, lines 50-52). Mizobata further discloses that the fluorescent layer is formed on a photoreflection layer (see Fig. 1, item 10), which minimizes reflection of external light (column 3, lines 47-49).

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the flat panel display device of Mitsutake et al. to include the fluorescent layer in a generally U-shape, as taught by Mizobata, for the added benefit of minimized reflection of external light.

Response to Arguments

23. The examiner acknowledges amendments to claims 1, 13, 15, 16 and 19, as well as the removal of identification numerals from the specification and the abstract.

24. Regarding the metal sheet provided on a surface of the light-transmissive substrate perforated with a plurality of holes, with each hole having on of the phosphor disclosed within,

the examiner respectfully disagrees with the applicant. Figure 4B clearly shows an electroconductive member 21b, with holes containing specific phosphors.

25. In response to the amendment to the claims the examiner has provided new rejections.

26. Spindt et al. is provided to show prior art with a metal sheet capable of holding spacers not to have a plurality of holes, which was shown in Mitsutake et al.

27. Ando et al. shows an adhesive layer that bonds the metal sheet to another component in the display device. This is prior art is bonding metal sheets via adhesives in the art of flat panel displays and is thus not novel.

28. Mizobata is used to reference U-shaped phosphors, the other limitations of the claimed invention are overcome by Mitsutake et al. and the other disclosed references.

Final Rejection

29. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony J. Canning whose telephone number is (571)-272-2486. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh D. Patel can be reached on (571)-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anthony Canning

23 November 2005

ASHOK PATEL
PRIMARY EXAMINER